# Botanic Magazine

## Volume 4

Official publication of the Friends of the Royal Botanic Gardens, Melbourne Inc.





Front cover designed by Louise Coronel. Illustrations are clockwise left to right:

1. *Eucalyptus camaldulensis*, artist Billie Langford.
2. *Vallota speciosa*, artist Cheryl Martin.
3. *Stenocarpus sinuatus*, artist Mary Gregory
4. *Paeonia* "Thunderbolt" (black/crimson single hybrid tree peony bred in America in 1948 by Professor Saunders), artist Judy Robert.

Autobiographical details of artists are included on page 41.

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# Contents

# The Former Melbourne Observatory

**Halina Eckersley***

In the magnificent landscape of Melbourne's Domain gardens stands hidden a small complex of buildings, the former Melbourne Astronomical and Magnetic Observatory. In its heyday this Observatory rivalled the best equipped institutions of its type in the world, providing the world with basic scientific information unavailable from other sources. The Great Melbourne Telescope[1], one of the world's major astronomical instruments to be constructed in the second half of the nineteenth century, was housed in a building still standing in the Observatory grounds.

Unlike the gardens around it, the landscaping of the Observatory was established and maintained primarily for the purpose of screening and protecting the delicate instruments from dust. The surviving elements of the early planting (and pruning) programs, therefore, add to the appreciation of the functioning of the Observatory, an important historic complex designated under Victoria's Historic Buildings Act.

The establishment of the Observatory in such close proximity to the Botanic Gardens and Government House was fraught with difficulties and conflict, Ferdinand Mueller being especially hostile to the undertaking.

Melbourne originally needed an astronomical observatory for fairly practical reasons. During the nineteenth century accurate ship clocks (chronometers) were essential to navigation, being used in conjunction with the position of stars, to determine a vessel's longitude. A voyage from Europe to Southern Australia often took as long as four to six months in the 1850s, the ship's captain having no means of rating his chronometer for the duration of the return journey. This tended to make navigation much less precise and the voyage, therefore, much more dangerous.

With the greatly increased sea traffic, following the gold discoveries in Victoria, the Government came under great pressure to provide a reliable time service in the Colony's main port, Williamstown. To do this, an astronomical observatory had to be established – astronomy providing the means of the most accurate calibration of time.

The Point Gellibrand Observatory was set up in 1853[2], and in July of that year, Robert Ellery (a surgeon by training) was appointed[3] to obtain observations necessary for the giving of time signals, rating of chronometers and adjusting other nautical instruments. The time signals were originally given by dropping a time-ball from the Williamstown Flagstaff, with a corresponding flag signal being shown at the Melbourne Flagstaff. Although the instruments at the Astronomer's disposal were few and rudimentary, and the Observatory's location far from ideal, Ellery appeared happy to stay at Williamstown.

It is doubtful the present Domain Observatory would have existed, if it had not been for the efforts of three individuals of drive and vision, who were determined that scientific endeavour should flourish in the young colony. They were George Frederic Verdon, Georg von Neumayer, and most importantly, William Parkinson Wilson.

Verdon[4], who was later to become Victoria's Agent-General in London and the Australian Manager of the E.S.&A. Chartered Bank, arrived in Victoria in 1851, and in 1854 settled in Williamstown where he ran a ship-chandler's business. Being interested in astronomy, he assisted Ellery at the Observatory in an honorary capacity. In 1854 he became one of the founding members of the Victorian Institute for the Advancement of Science. This body was soon to merge with the Philosophical Society to form the Philosophical Institute of Victoria which subsequently became the Royal Society of Victoria.

Neumayer[5], a Bavarian physicist, came to Victoria in 1857 with backing from the King of Bavaria and leading British scientific institutions to investigate terrestrial magnetism and related phenomena in the Southern Hemisphere. On arrival, he too joined the Philosophical Institute of Victoria.

Wilson[6], a brilliant scholar and mathematician with a consuming interest in astronomy, was appointed in 1854 the founding Professor of Mathematics at the newly created University of Melbourne.

From the late 1840s, the British scientific establishment was trying to convince the Government to fund the construction of a large reflecting telescope (or reflector) at the Cape of Good Hope Observatory, for the purpose of continuing research on southern nebulae and multiple stars. This research was begun at the Cape two decades earlier by the eminent astronomer, John Herschel. Wilson appears to have known[7] the difficulties which this project encountered both in Britain and South Africa. It is possible that he accepted the Melbourne University post, a virtual academic exile, with the idea of establishing the telescope and doing the important research work in Australia.

After arriving in Melbourne in 1855, Wilson joined the Philosophical Institute, and through that body began to agitate to have the great southern reflector, and an observatory to house it, established here rather than at Cape Town[8]. His arguments were put to the Government of the day which did not appear to be particularly interested, although some vague promises of support were made. Neumayer's arrival and proposed research program into terrestrial magnetism gave Wilson new ammunition, and a revised proposition for an astronomical, meteorological and magnetic observatory was put to the Government.

This second approach met with partial success. In 1858 the Government offered Neumayer the disused signal station at Flagstaff Hill as a Magnetic Observatory, a location far from ideal for his purposes. Meanwhile Ellery's Williamstown establishment had almost ground to a stop for lack of suitable accommodation.

In 1857 Verdon stood for the seat of Williamstown in a Legislative Assembly by-election. He lost by seven votes[9], but finally won the seat when he contested it again in 1859. Verdon's election to Parliament and subsequent appointment as Treasurer decided the Observatory's fate.

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* Halina Eckersley, who is an architect with the Historic Building Branch of the Department of Planning and Housing, completed a Heritage Study of the Former Melbourne Observatory in 1986 for the Museum of Victoria. It is envisaged that the Observatory Complex will eventually become the Astronomical Branch of the Museum of Victoria.

On 8 December 1859 Verdon moved in the Legislative Assembly that Observatories supported by the Government should be under the supervision of a Board of Visitors, similar to that governing the Royal Observatory at Greenwich. That Board of Visitors, consisting mainly of members drawn from the newly renamed Royal Society of Victoria, was appointed in 1860. It included both Verdon and Professor Wilson.

Although the Observatories now had political clout, events did not run as smoothly as they could have.

On arrival in Melbourne in 1857, Neumayer surveyed a number of sites he thought suitable for a magnetic observatory. He found the best site to be near the Botanic Gardens[10]. This was close to the site where Ferdinand Mueller, Government Botanist and the Director of the Botanic Gardens, subsequently proceeded to have the Botanical Museum erected.

The Museum building was completed by 1860, when the Board of Visitors decided that the Williamstown and Flagstaff sites were totally unsuitable for their purposes. On Neumayer's insistence and with half-hearted backing from Ellery, who wanted to stay at Williamstown or move to Royal Park[11], the Board proceeded, in all seriousness, with moves to have the newly completed Botanical Museum demolished[12], with a view to having the new Observatories erected on its site.

Mueller responded with the suggestion that the Observatory complex should be located on the Government House Reserve, stressing that if the Botanical Museum was demolished a new building would have to be completed a year before it could be used for the storage of dried plant material[13].

The Observatory site was marked out in May 1861, to accommodate the necessary buildings which had already been designed by Gustav Joachimi of the Public Works Department, working under the direction of Wilson and Neumayer.

But Ferdinand Mueller was not happy with his prospective neighbours, and decided that the best way to get rid of them was to make the Observatory complex appear to have been built across a public thoroughfare. When Wilson found out he was furious. He wrote to Ellery on 9 August 1861[14]:

> In consequence of what I heard from Captain Kay[15] some days since . . . I went yesterday afternoon to the site of the new observatory to see for myself Dr. Mueller's doings. A double row of trees forming an avenue is planted quite up to and abutting on the very centre of the south boundary of the observatory grounds and the [illegible] for the continuation of it found across our ground and continued down to the [illegible] gate near Prince's bridge. The walk passes within a very few feet of the spot where we marked out the building for the observatory.
>
> The trees are actually planted up to within three feet of our boundary and the line is marked out across our ground and yet Dr. Mueller had the unparalleled impudence to tell me that he intended the walk to run round the end of our ground and then resume its own line on the opposite side. His purpose however is obvious. Either to drive away the Observatory altogether, or, failing that, to make it appear as much as possible an obstacle to the public. To make it seem as if we had built it across an established public walk. It is clear at all events that we shall experience from him long opposition that his influence and unscrupulousness can bring to bear . . .
>
> . . . Also if anything can be done to fence in our ground *at once* it should be done. It will never do for us to allow the footpath to be planted and made and then to come in and block it up. I shall be glad however to have a chat with you on the subject . . . I will also try to see Verdon about it.

The Board of Visitors was immediately mobilized to the Observatory's defence. When Mueller was asked to explain "his doings" he replied that[16]:

> . . . I directed a line of footpath in continuation of one recently formed in the botanic Gardens Reserve to be marked out by light furrows (at an average four inches depth) . . . with a view of submitting the adoption of the line for the consideration of . . . the Board of Land and Works . . . for the numerous pedestrians passing daily from South Yarra to Prince's Bridge . . .
>
> In marking out the above line I was studious to hold it away as far as the fall of the ground permitted from the Observatory site. Nothing whatever is done beyond forming the slightest superficial furrows to bring the line, which I would have had the honor to propose forming, clearly in view, and I entertained a hope that by spontaneously stepping forwarding [*sic*] to aid in the embellishment of some of the most desolate spots near the city, in which endeavour I have been very generously rewarded by the honourable the Board of Land and Works, I would not only confer a service on numerous residents in the neighbourhood, but also lead a beautiful avenue both to the Observatory and Museum . . . etc.

But Charles Ligar, the Surveyor General (and a member of the Board of Visitors to the Observatory) appears to have had prejudged the matter when he sent the following curt note to the President of the Board of Land and Works on 13 August 1861[17]:

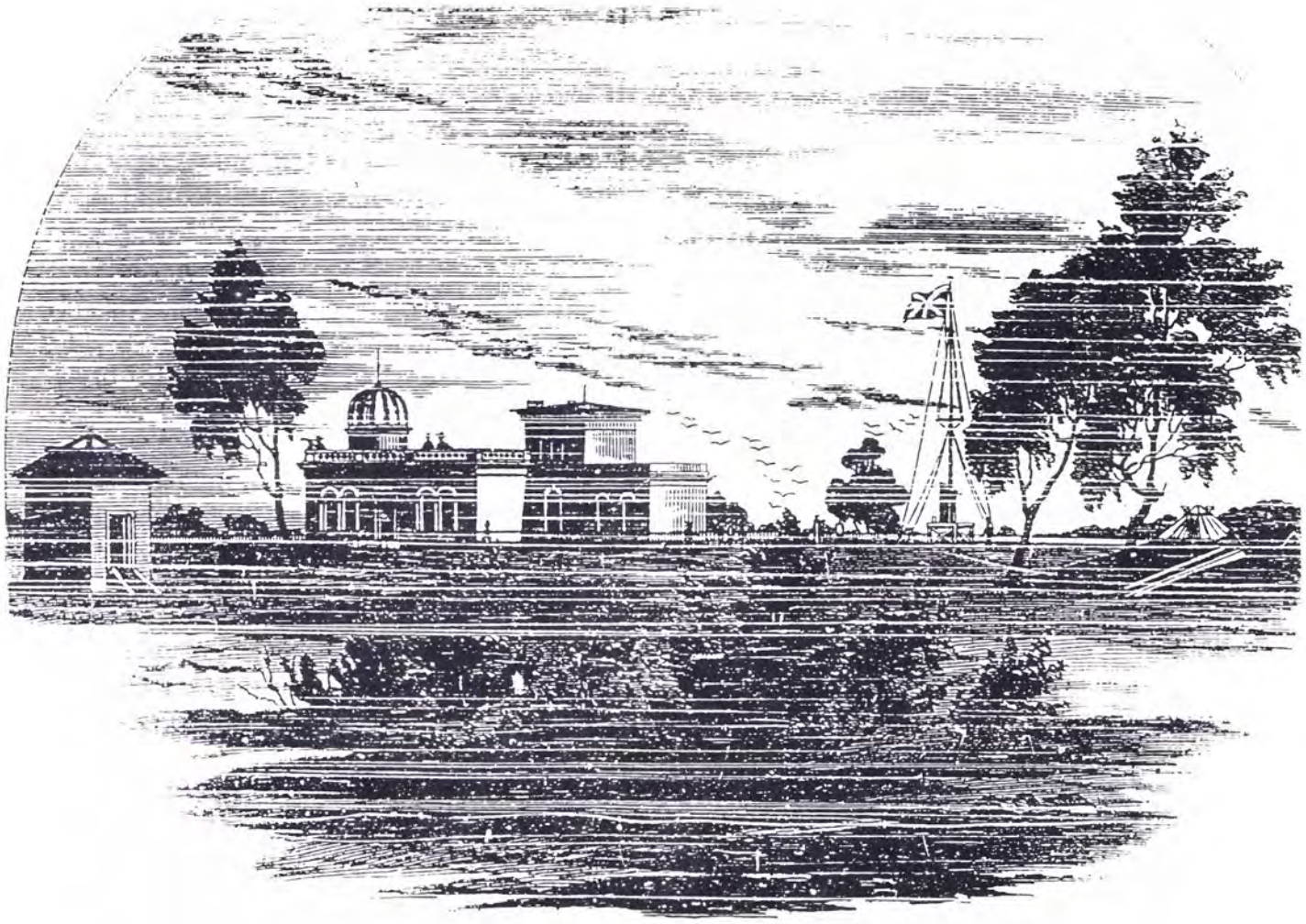
> It appears that Dr. Mueller has set out and planted a road way since the Proclaiming of the Observatory Reserve took place, and made the said road abut upon the land so reserved. I am not aware that Dr. Mueller has received any authority to set out roads through the land in question or that he has any instructions with reference to this one in particular.

Further discussions followed between Wilson, Ellery, Verdon and Mueller, as a result of which the site of the Observatory was moved slightly eastwards and became elliptical in plan.

But Mueller was still unhappy. As the magnetic buildings, which were the first to be erected, went up he complained[18]:

> I regret to see that actually a high building (I suppose belonging to the meteorology Department) is rising right in front of my [*sic*] museum, thus totally defeating the object for which the Government . . . (page missing)
>
> Mr Neumayer's absence of [*sic*] the only alternative of securing a protest against the progress of the building to the Government. Pray let Mr Verdon know; that gentleman acted so kindly in the matter.
>
> You will easily persuade yourself, that the panoramic view from my museum by the intended building is entirely spoiled.

But all these complaints were to no avail. The Observatory was there to stay. The magnetic buildings were finished in October 1861 and the astronomical building was ready for occupation by June 1863. Melbourne at last had a fully fledged astronomical and magnetic research establishment, albeit with a very unhappy neighbour.



New Oservatory, St. Kilda Road, 1863.
(*Illustrated Melbourne Post*, 4 April 1863.)

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2. R.L.J. Ellery, 'A brief history of the beginnings and growth of astronomy in Australia', in *Report of the 8th Meeting of the Australasian Association for the Advancement of Science.* Melbourne 1901, p.7-8.
3. The first person appointed to set up the time-ball service at Williamstown was Pownall Pellow Potter, the sailing master of the ship *Terror*, which carried a magnetic expedition from Britain to the Southern Hemisphere in 1840. He resigned before the service was fully operational.
4. A.G.L. Shaw, 'Sir George Frederic Verdon'. *Australian dictionary of biography* v. 6, 1851-1890, p. 330-332.
5. R.A. Swan, 'Georg Balthasar von Neumayer'. *Australian dictionary of biography* v. 5, 1851-1890, p. 329-331.
6. 'William Parkinson Wilson'. *Australian dictionary of biography* v. 6, 1851-1890, p. 419-420.
7. B. Warner, 'The large southern telescope: Cape or Melbourne?' *Quarterly journal, Royal Astronomical Society* v. 23, 1982, p. 505-514.
8. Proceedings of the Philosophical Institute, 19 November 1856.

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   Philosophical Institute, Minutes of Meeting 25 September 1857.

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9. Melbourne Observatory, Letter Book. R. Ellery 1857-1880 P.R.O., V.P.R.S. 776.

   Letter from Ellery to Turner 19 November 1857.
10. The First Report of the Board of Visitors to the Observatories, 1860.
11. ibid.
12. Minutes of the Board of Visitors to the Observatories, 7 August 1860.
13. ibid. 17 January 1861.
14. Melbourne Observatory material. P.R.O., V.P.R.S. 869.
15. Joseph Henry Kay was probably Australia's first geophysicist. He was a member of the Board of Visitors to the Observatories from its inception in 1860 until his death in 1875.
16. Correspondence on Observatory Reserve, F. Mueller to C. Hodgkinson, 20 August 1861 Museum of Victoria, M.O.5.40.
17. Correspondence on Observatory Reserve, Museum of Victoria, M.O.5.40.
18. Correspondence on Observatory Reserve, Museum of Victoria, M.O.5.31.

# LANDSCAPING CHRONOLOGY 1862-1935

The following material was collated from Public Works Department contract summaries, Astronomer's annual reports to the Board of Visitors, Government Gazettes and Board of Visitors reports and minutes.

1862 Fencing reserve 1862 (contract).

1863 "Grounds are being partially planted with Trees & Shrubs." (Astronomer).

1868 Addition on North side of 1 acre, 1 rood (gazetted 3/3/69) for Great Melbourne Telescope.
Fencing St. Kilda Rd (contract) (presumably includes new area).

1871 "I propose to plant a few more trees and shrubs on that portion of the Observatory grounds occupied by the Great Telescope which has been enclosed since the first planting was done." (Astronomer).

Boundary fence repaired and painted (contract).

1876 "The grounds of the Observatory are not in a state I could desire. The alteration in the Domain having rendered it necessary to provide a new mode of access, a road was partly formed about 18 months ago to open on to the park drive to the south-west, and the gates on the north-east side have just been moved to the new position. In consequence of these alterations, which will no doubt eventually be a great improvement, the Observatory ground has been much broken up and appears somewhat in disorder. I propose to do such planting etc, as the means at my command will admit of, for which Mr Guilfoyle the Director of the Botanical Gardens, promises the necessary trees. The proximity of the Observatory grounds to the new residence of the Governor, and the fact that they form a part of the Domain, render it very desirable that the horticultural arrangements and care of them should be undertaken in connection with the rest of the Domain, and I would ask the support of the Board in the endeavour to bring such an arrangement about." (Astronomer).

1877 "The new entrance and approaches to the Observatory, which were in progress at the date of the last visitation, have been completed, and the grounds have been partially planted by Mr Guilfoyle, the curator of the Botanical Gardens." (Astronomer).

1878 "There has not been much change in the grounds or approaches during the year. Mr Guilfoyle has, however, done some planting in furtherance of a general scheme for gradually improving the Observatory enclosure." (Astronomer).

1879 "There has not been much done to the grounds since the last visitation, except some little planting. The fencing which surrounds the grounds is getting into bad repair, and will soon require attention." (Astronomer).

1880 "The grounds are in as good condition as the means at my disposal will allow. The main drive, however, requires re-gravelling, and the fencing which surrounds the reserve has been decaying rapidly for the last few years, and the question of a new one or very extensive repairs will shortly claim attention." (Astronomer).

1881 "... some little clearing and planting has, however, been done, and, in view of a probable future change in the character of the enclosing fence, a hedge of Cape Thorn has been planted all round by the Curator of the Botanical Gardens ... The Observatory grounds form an irregular oval, containing 5.5 acres; close along the west side runs one of the principal park footpaths, while the east side abuts on to the fence of the Government House grounds, which forms a tangent to it. It is proposed to remove the Observatory fencing on that side and join it to that of Government House by lines nearly tangential to the north and south ends of the oval. This will lessen the amount of fencing, and do away with the objectionable cul-de-sacs now existing between the two fences." (Astronomer).

1882 Board reports: "We have again to notice the condition of the grounds about the Observatory. No fund is provided for improving them, nor even for keeping them in order; and we beg leave to repeat our recommendation that they be put under the general supervision of the Director of the Botanical Gardens, and that he be requested to plant them largely in the spring, to check the dust, which, raising on the St. Kilda road, enters the buildings and injures the instruments."

1883 "By the kind assistance of the Curator of the Botanical Gardens, I have been able to gradually effect some improvement in the Observatory grounds by laying out, trenching, and planting clumps of trees and shrubberies, and clearing the intermediate portions of undergrowth so as to form rough lawns between the planted portions. Only the part immediately fronting the Observatory has been done up to the present, but I hope from time to time to extend this work to the southern and eastern portion of the grounds. The greatly increased traffic on the St. Kilda road, coupled with its bad state of repair during the last summer added seriously to the dust nuisance from which the Observatory has suffered more and more each year. To mitigate this as far as possible, I propose planting densely-growing shrubs and trees around the ground as rapidly as means at my command will admit. I trust, however, that when the alterations to the road now in progress are completed that there will be a diminution of this inconvenience.

The extensive repairs to the fencing around the grounds carried out last year have greatly improved its appearance, and will also, I hope, prolong its existence until the hedge of Cape Thorn, planted around it about two years ago, has grown sufficiently to form a fence by itself." (Astronomer).

1884 "Keeping the grounds in order gives almost constant occupation to one labourer ... Two new shrubberies, between the main building and the large telescope house, have been formed and planted, new paths formed, and old useless ones grassed over." (Astronomer).

1885 Board reports : "We also noted ... the necessity for metalling or gravelling the carriage approach from the park to the Observatory ..."

"The grounds have been considerably improved, and, as funds are now voted for keeping it in order, I hope to continue the improvement until it is in really good order. There are about six acres, a large Portion of which is in shrubberies; these, with the walks between the various buildings and instruments, require constant attention to keep them in a proper state." (Astronomer ).

1885-86 New fence, repairs re Observatory (contract).

1886 Board reports: "The increase of dust in the neighbourhood of the Observatory requires that every means shall be adopted to protect the instruments from its effects. Belts and masses of trees between the roads and the Observatory buildings form the most effectual screens . . . We recommend that the Curator of the Domain, Mr Guilfoyle, be requested to bear this important object in mind when he lays out the planting of the Park between the St. Kilda road and the Observatory."

"Improvements to the grounds have been continued by planting, clearing, and attention to shrubberies, etc., and they are now altogether in a much more satisfactory condition than formerly, when the means at my command for this purpose were barely sufficient to keep them from becoming a wilderness. The increasing dustiness of the neighbouring roads and parts of the city renders it of the utmost importance to keep as dense a screen of foliage around the building as possible, especially to the north and west. The plantations are now rapidly increasing within the grounds, and . . . Mr Guilfoyle, has promised to keep our necessities in this direction in view in dealing with the plantations in the Domain outside our grounds; it is hoped that much of the dust which now invades the Observatory with strong north-west and westerly winds will be thereby considerably diminished." (Astronomer ).

1887 " the shrubberies very much improve the surroundings of the Observatory. The suggestion . . . relative to maintaining a good plantation between the Observatory and the St. Kilda-road has been approved by the Government, and Mr Guilfoyle informs me he is increasing the group of trees considerably this season in the locality referred to.

The approach to the Observatory from town and the Public thoroughfares has been unsatisfactory ever since the St. Kilda-road was lowered. Before that took place, the drive from this road into the Domain gave convenient and ready access to the Observatory for vehicles, but since then the only vehicular approach is from the Domain-road at the back entrance to Government House . . . An entrance to the old drive near the gates to the Government House might be easily made, and a very great convenience afforded to numerous visitors to the Observatory." (Astronomer).

1888 "The grounds are in a satisfactory condition, and, being now able to obtain the services of a gardener for a large part of the year, I expect they will be kept in good order, and still further improved. The growth of the trees and shrubberies around the grounds is now giving us great shelter both from strong winds and from dust storms in summer.

As regards the approaches . . . we are as badly off as ever, and, although some preliminary work has been done for opening up an entrance from the St. Kilda-road near the Government House gate, all vehicular traffic to the Observatory has to go nearly half-a-mile around by the Domain road . . ." (Astronomer).

1889 " . . . the shrubberies are now well grown . . . Some additional planting is done every season. The new road into the Domain entering close to the Government House gates is now nearly complete . . ." (Astronomer).

1890-91 Repairs, painting, fencing (contract).

1902 "A general cutting down of trees within the Observatory grounds was done last winter (1901). This unpleasant task was rendered necessary for observations of celestial objects at low altitudes. Many more trees still require to be cut down for the same purpose, outside the Observatory enclosure, but I have found it very difficult to obtain permission to make a complete clearance owing, it is alleged, to a strong public feeling against the disfiguring of the parks, especially in regard to the adjoining Government House grounds." (Astronomer).

1903 "The grounds in the immediate vicinity of the main buildings have been altered a good deal to suit the new additions (new strong room, Astrophotographic Measuring Bureau and Closets). Two new asphalted paths have been made, also new beds and shrubberies all round the southern half of the Observatory, and some new fencing with a gate to serve as a back entrance." (Astronomer).

1905 "A new path leading to the western entrance of the Great Telescope House has been made, and the grounds have been generally improved by the addition of new flower-beds and plantations, especially around the new buildings (Whirling room, Great Melbourne Telescope building). The existing paths have been re-asphalted." (Astronomer).

1909 "Repainting, repairing and partly renewing the boundary fences." (Astronomer).

1914 " . . . water service of the Observatory was considerably improved by tapping the main Yarra water pipe in the Domain . . . This concession, for which I am greatly indebted to the Director of the Botanical Gardens, who recommended it, has enabled the Observatory gardener to keep the grounds in good condition, and pleasing in appearance, even through the present exceptionally dry season." (Astronomer).

1925-26 New fencing Observatory and Grounds (contract).

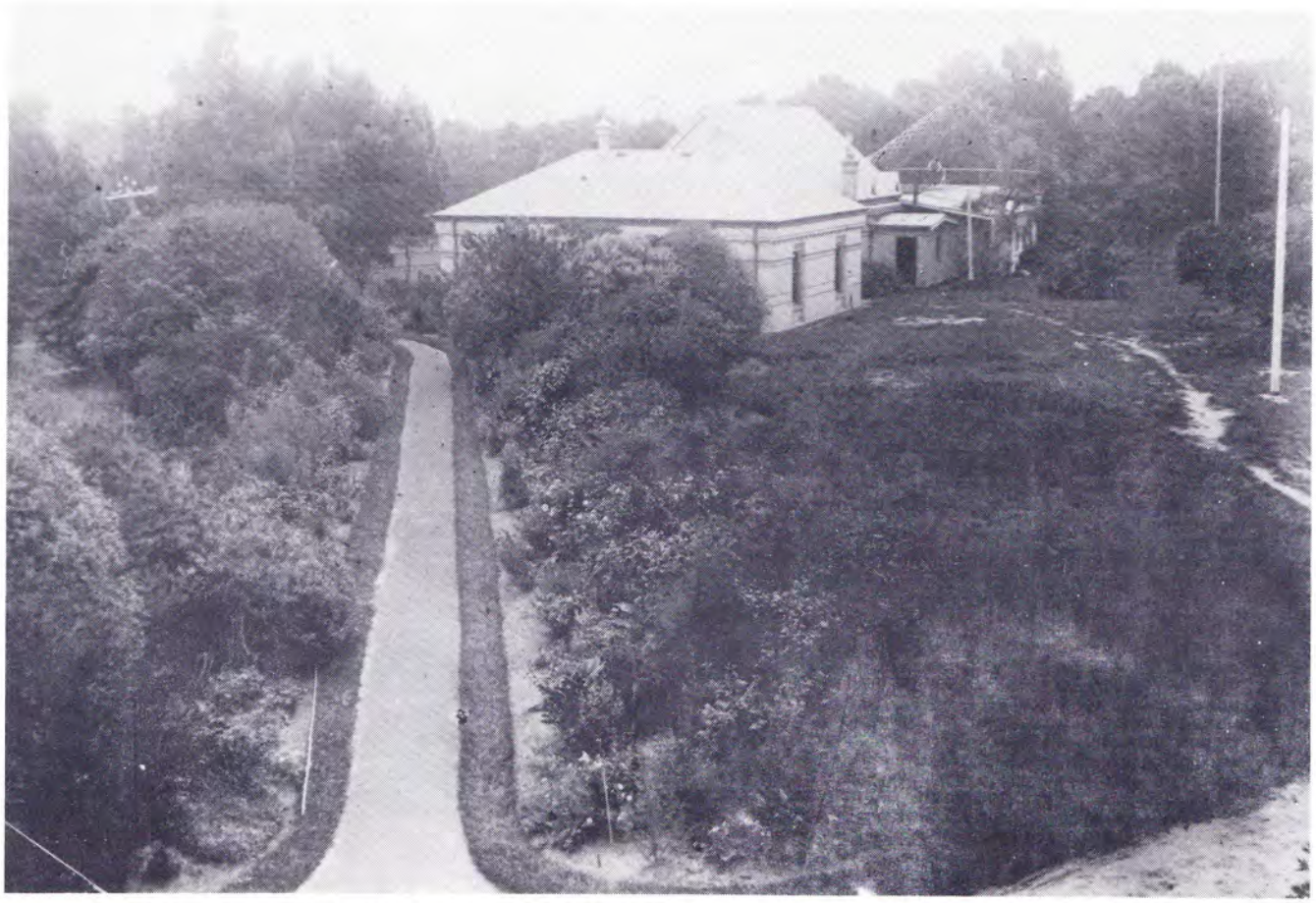
1935 A tan-track was run from the end of the present track at Government House gates, past the Observatory and the Botanical Gardens to end near the south end of Anderson Street. (Board Minutes).


View of Melbourne Observatory from the tower of Government House, c.1888-89, looking south-west towards Albert Park Lake.

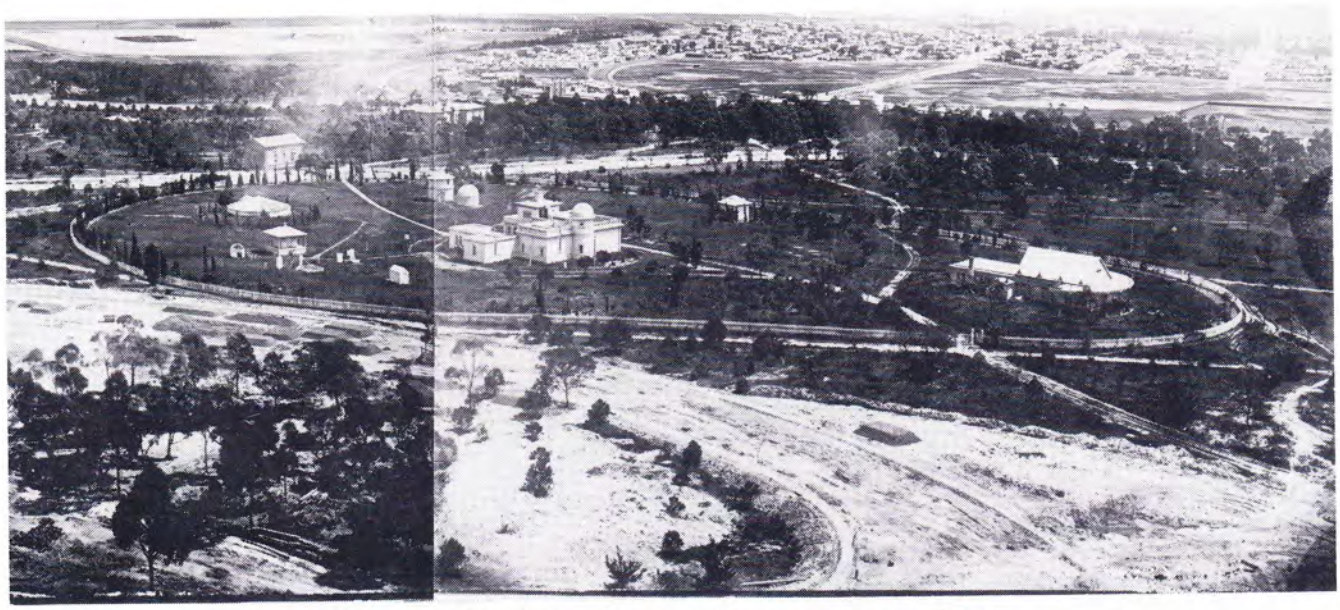
1 Meridian Marker for 8" Transit Telescope (built 1885) (= Obelisk)
2 Von Mueller's herbarium
3 Magnetic House (1876-77)
4 Thermometer shelter (built 1878/79; re-located 1885)
5 Stevenson screen
6 External thermometer for 8" Transit Telescope (1885)
7 8" House for 'South Equatorial' Telescope (c.1874)
8 Site of Astrograph Telescope House (completed March 1890)
9 Annexe for 8" Transit Telescope (1883-84)
10 Main building (1861-63): meteorological office and instruments
11 Main building: dome for 4 1/2" 'North Equatorial' Telescope
12 Site of Caretaker's Residence (c.1880)
13 Absolute Magnetic House (1861-63; no longer extant)
14 48" Great Melbourne Reflecting Telescope (1868)
15 Workshop (1887-88)
16 Great Melbourne Telescope House (1868-69)
17 Gardener's shed
18 Photoheliograph Dome (c.1874)
19 Drive to main entrance
20 Site of Anemometer tower

(Museum of Victoria, Melbourne Observatory Photograph Collection. (Above text by J. Kendall, Museum of Victoria.))

Great Melbourne Telescope Building, post-1877.
(Print from a copy held at the Weights and Measures Branch, Ministry of Consumer Affairs.)



Melbourne Observatory. View of Great Melbourne Telescope Building c.1904-08.
The image shows the planting around the Great Melbourne Telescope Building carried out c.1905 following additions to the structure.
(Print from glass plate held by Mr Lance Woodhouse, grandson of G. H. Woodhouse, Assistant at the Observatory 1904-44.)

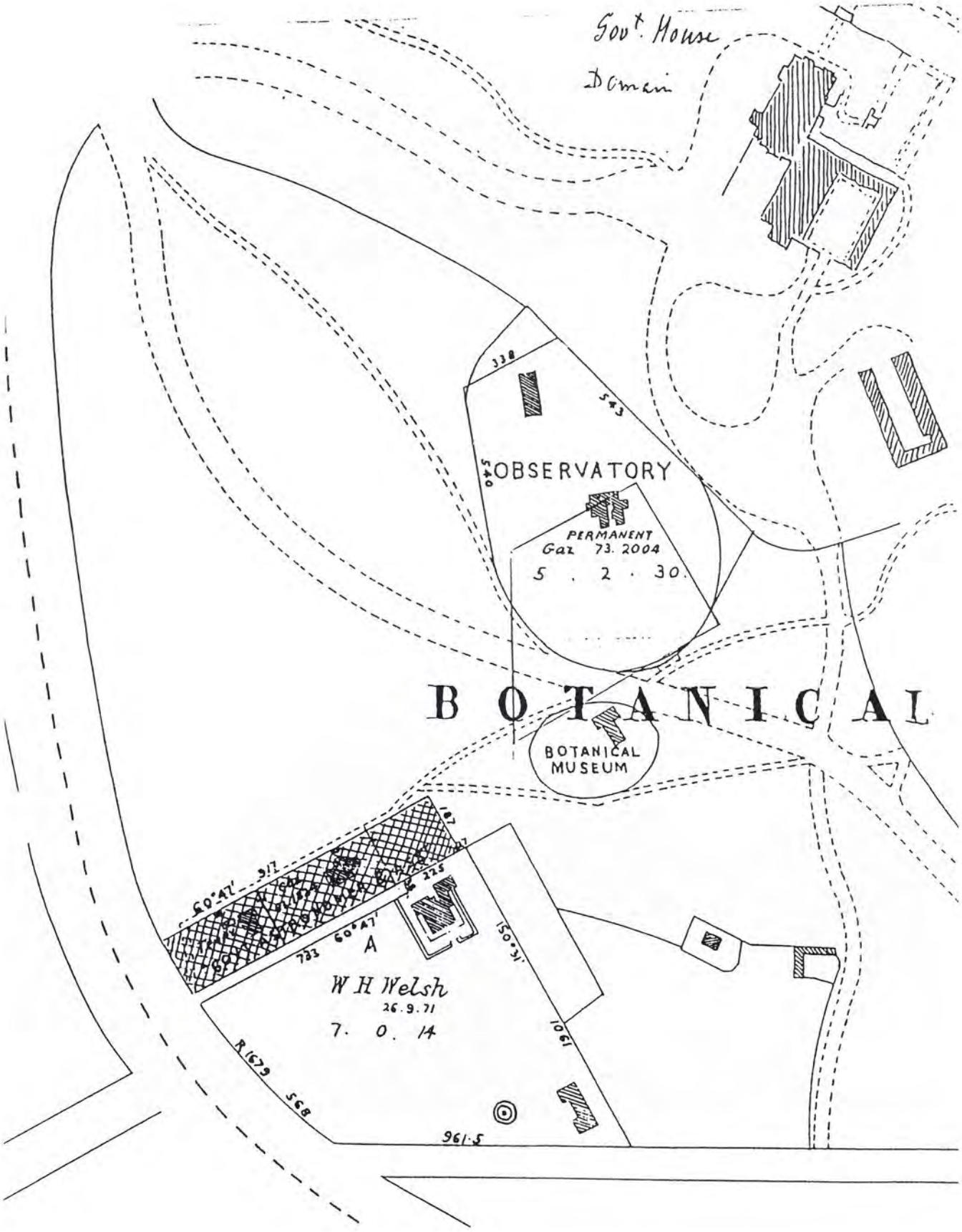


Observatory Complex from the tower of Government House, c. 1875-76.
(Holtermann Collection, Mitchell Library, State Library of New South Wales.)

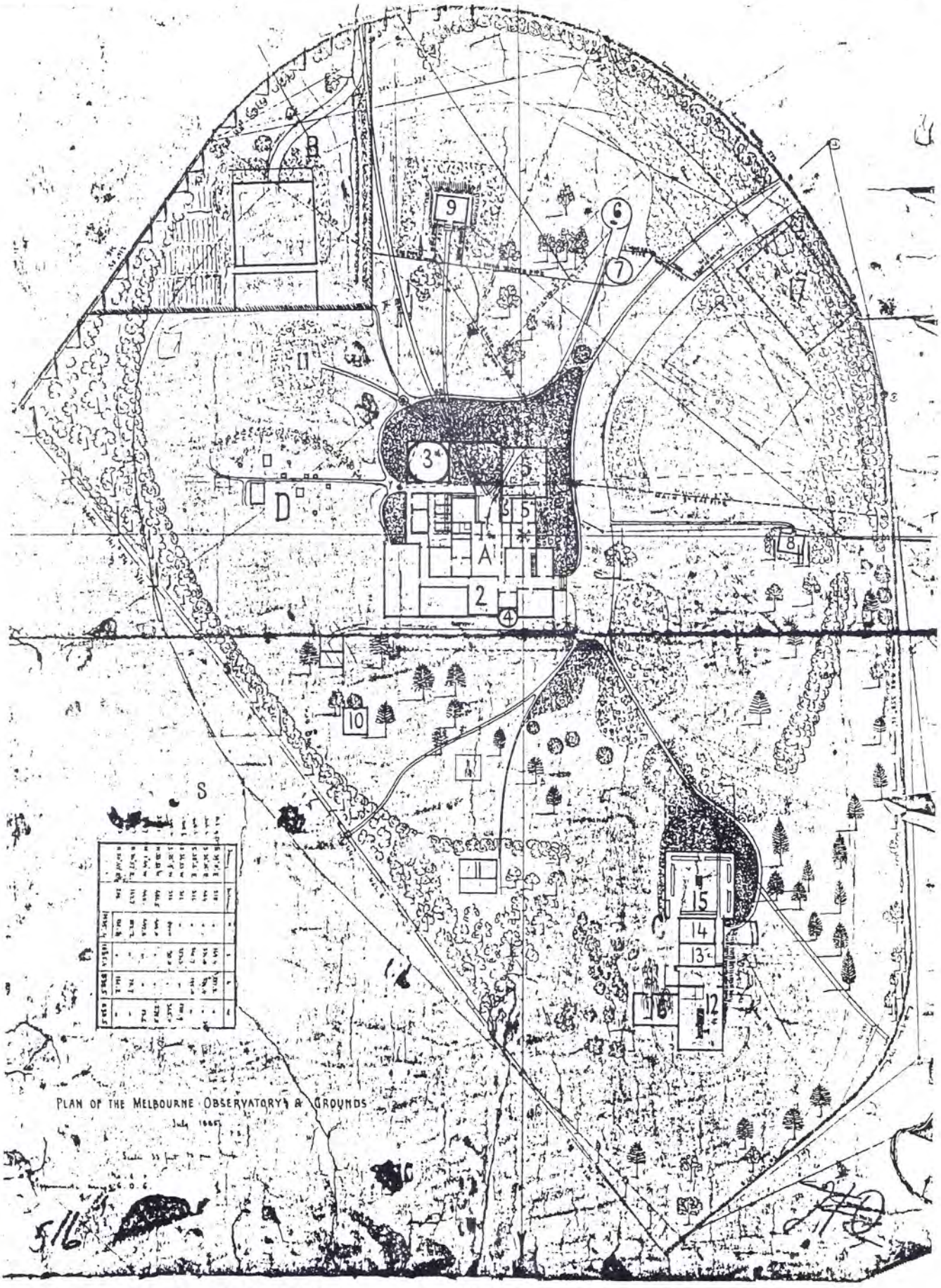
Melbourne Observatory, Main Building and the Great Melbourne Telescope Building, post-1883, pre-1889.
(Museum of Victoria, Melbourne Observatory Photograph Collection.)

Main Building, Melbourne Observatory post-1902.
(Museum of Victoria, Melbourne Observatory Photograph Collection.)


Melbourne Observatory 1907.
(Photograph held by Mrs T. Merfield, from the collection of C. J. Merfield, Cheif Assistant at the Observatory, 1915-31.)




Plan of the Melbourne Observatory and Gardens, July 1885. P. B. (Baracchi?)
(Pietro Baracchi subsequently became the second Government Astronomer.)
(Original drawing held by Weights and Measures Branch, Ministry of Consumer Affairs.)




Drawing supplied in August 1913 by J. M. Reed, Surveyor General to the Board of Visitors to the Melbourne Observatory, when the Government was considering demolishing the original Astronomer's and Assistant Astronomer's residences. The property known as the "Grange" was sold by the Crown in 1871, following a technical irregularity in its gazettal for Astronomer's Residence purposes. The trapezoidal site temporarily reserved in 1861, and not proceeded with, has been superimposed on the drawing for the purposes of this report.

# The Botany of Cook's Voyages


## Christopher Humphries*


James Cook's first voyage in the indestructible, tiny vessel, the Whitby collier, *Endeavour,* lasted from 1768, when he set sail from Plymouth harbour, to 1771 when he arrived back in Deal, Kent. His expedition was to become the admiring fancy of the civilised world in the time which was enjoying the pursuits and fruits of the Age of Reason and today is considered a major landmark in history.

Even the mandate for the voyage was one to light the flame in the imagination, perhaps the most romantic charge to be given any expedition: to observe and chart the transit of Venus. This is one of those astronomical happenings which are not arranged for the convenience of man. In 1639, the young English clergyman, Jeremiah Horrocks, had attempted, and failed, to plot the transit of Venus on a day during which the Planet passes in a direct line between the Sun and the Earth. A correct observation would have given the exact distance between the Earth and the Sun and would have afforded an invaluable aid to the science of that time, including something as basic as getting from one place to another without floundering around the seas of the world.

There was another transit in 1761, and another failed attempt. The next transit was to be on 3 June 1769 after which there would not be others until 1874 and 1882. It was decided that one of the best places of a possible three to make the observation was Tahiti, discovered in the Pacific by the Englishman, Captain Samuel Wallis. It was known that there was a good harbour, plentiful food and water and friendly people. And so the *Endeavour* expedition was proposed by the Royal Society with the backing of the Admiralty and some funding, £4 000, from King George III, a man despite his standing in America at the time, who was seriously interested in supporting scientific enterprise. Lieutenant James Cook was appointed as the leader of the expedition.

There is, as we all know, a mathematical harmony of the spheres, but in order to observe it you have to be able to see them. In the case of Venus the trouble lay in enveloping haze. So, Cook's observation too was a failure. Although extensive readings of the transit were later undertaken in 1874 and 1882, it is unlikely that anyone else will bother in the Junes of 2004 and 2012 since more accurate methods exist than solar parallax these days.

Still there were other things to do in the Pacific. Cook had other orders which eventually turned out to be of much greater significance. These were to go on from Tahiti in search of the elusive unknown southern continent which men, for generations, had speculated was there, the mysterious Terra Australis Incognita, the unknown southern land, the continent of Australia.

Cook's journals describe the orders he was to carry out following the observation of the transit, and I quote:

> I was therefore ordered to proceed directly to Otaheite (Tahiti) and, after the astronomical observations should be completed, to prosecute the design of making discoveries in the south Pacific Ocean by proceeding to the south as far as latitude of 40°; then if I found no land, to proceed to the west between 40° and 35° till I fell in with New Zealand, which I was to explore and thence to return to England by such route as I should think proper.

And he was instructed further:

> You are also to be careful to observe the nature of the soil and products thereof, the beasts and the fowls that inhabit or frequent it; the fishes that are to be found in the rivers or upon the coast, and in what plenty, and in case you find any mines, minerals or valuable stones, you are to bring home specimens of each, as also such specimens as the seeds of trees, of fruits and grains as you may be able to collect, and transmit them to our secretary that we may cause proper examination and experiments to be made of them.

Sir Joseph Banks. Engraving from *Picturesque atlas of Australasia.* Sydney, 1888

At this point the remarkable Joseph Banks came on to the scene. He was 25 years old at the time, already a member of the Royal Society over which he was later to reign as president for 41 years, very rich, a respected botanist and possessor of that kind of confidence which is still noted among certain Englishmen (and women when thinking of Margaret Thatcher) which then, among themselves, was next in order to God. Banks was healthy, strong, good looking, outspoken and, if not overly sensitive, intelligent, stubborn and quite courageous.

Banks was charming, and he could get things done. The main reason was that his income was about £6 000 per annum, a great sum of money at a time when

* Dr Christopher J. Humphries, a Taxonomist and Biographer at the British Museum, played a major role in the development of the plates for the *Banks' Florilegium*. This paper formed the contents of his lecture for the Friends in 1990. He talked about the 'Botany of Cook's Voyages; the treasures from the *Endeavour,* and commented on the Bauer plates from the Flinders Voyage.'

Samuel Johnson lived comfortably on the King's annual pension of about £250 per annum. His fortune, derived from vast family land holdings in Lincolnshire and Derbyshire, would have him today in the class of Queen Elizabeth with hundreds of millions of pounds. Banks is one of the very few people on earth to have gone to both the famous Harrow and Eton Public Schools. However, he was an indifferent scholar, but he was intensely devoted to studying the natural world, and botany in particular. When he should have been learning Greek and Latin he was, at the age of 14, deep into the study of plants, comparing the old pages of Gerard's Elizabethan herbal with what he saw in his long collecting walks into the countryside.

From the public schools Banks went on to Christ's Church College, Oxford which enjoyed a professorial chair of Botany, occupied by Humphry Sibthorp. But it was not the style of the time for so distinguished a scholar to actually teach pupils. It should be noted, however, that he did give one lecture in 35 years. Banks, in his way, proceeded, with Professor Sibthorp's approval, to import to Oxford at his own expense a brilliant astronomer and botanist, Israel Lyons, so that he could have private lessons. Banks went on from Oxford to do some first rate collecting in Newfoundland and Labrador and when the *Endeavour* expedition came to his attention it seemed like a gift from Heaven. Friends and family thought, with very good reason, that such a voyage was entirely too dangerous and suggested instead the grand tour of the continent which was the thing for gentlemen of the time. His answer was typical. "Every blockhead, does that. My grand tour shall be around the whole globe". And so it was.

When he went on board the *Endeavour* he came with a party of eight, a great load of personal and scientific stores and equipment; this at a cost of about £10 000 gives an idea of how he travelled when you consider that the King's contribution to the remainder of the expedition was less than half of that.

He had found "much the best salt beef I have ever tasted" in New Crane Street, beer from a dealer near St. Giles, porter from another at Wapping New Stairs. He had barrels of salted cabbage, and sheep, fowls and pigs. Also, two greyhounds for no Englishman would, if he could help it, go anywhere without a dog.

A letter from Royal Society Fellow, John Ellis to the great naturalist Carl Linnaeus in Sweden describes Banks' preparation and I quote:

> No people ever went to sea better fitted out for the purpose of natural history nor any more elegantly. They have got a fine library of natural history; they have all sorts of machines for catching and preserving insects; all kinds of nets, trawls, drags and hooks for coral fishing; they have even a curious contrivance of a telescope, by which, put into water, you can see bottom to a great depth, where it is clear. They have many cases of bottles with ground stoppers, of several sizes, to preserve animals in spirits. They have several sorts of salts to surround the seeds; and wax, both bees wax and that of Murica.

Banks' party of eight included the ablest botanist in England, the Swedish scientist, Dr Daniel Carl Solander (1733-1782), prize pupil of Linnaeus, who had migrated to England. Also, the young botanical artist, the gentle quaker, Sydney Parkinson, then aged 23 years old. Others were another artist, Alexander Buchan (d. 1769), to record landscapes, Herman Didrich Spöring as secretary and occasional artist and four servants and field assistants — Peter Briscoe (1737-1810), James Roberts (1752-1826), George Dorlton (d. 1769) and Thomas Richmond (d. 1769).

The ship, which they shared with 84 officers, marines and seamen, was just 106 feet long, 29 feet three inches wide and 11 feet deep. There was not much room for turning around and they were to be gone for three years. Dr Johnson, who said things much more clearly than Shakespeare, had a look at her upon her return and said: "Going to sea was like going to jail with the added prospect of drowning".

The route of the *Endeavour* was to Madeira, Rio de Janiero, Tierra del Fuego, New Zealand, Australia, Batavia in Java, Cape Town, St. Helena and home to England.

Banks and Solander were indefatigable. Everywhere they went they collected, noted and observed. After a collecting venture in Tierra del Fuego, during which two of Banks' servants froze to death, due to drinking rum and falling asleep in the foul weather, Banks wrote in his diary:

> Of plants here are many species and those most truly extraordinary I can imagine . . . But to speak of them botanically, probably no botanist has ever enjoyed as much pleasure in the contemplation of his favourite pursuit than Dr Solander and myself among those plants; we have not yet examined many of them, but what we have turned out in general so entirely different from any before described that we have never tired with wondering at the infinite variety of Creation, and admiring the infinite care with which providence has multiplied his productions . . .

Back on board with their specimens the two botanists would

> sit at the great table with the draughtsman directly across from us. We showed him how the drawings should be depicted and hurriedly made descriptions of the natural history objects while they were still fresh. When a long journey from land had exhausted fresh things we finished each description and added the synonyms to the books we had . . .

The collection of botanical manuscripts is extensive and varied; all were written using the Linnean system and a complete set of manuscripts exist in Solander's hand for Tierra del Fuego, Tahiti, New Zealand, Australia, Java, the Cape of Good Hope and St. Helena. Fair copies of these exist in the hand of Spöring and include *Primitiae flora Maderensis, Brasiliensis, Tierra Del Fuego* and *Florae insularum Oceani Pacifici.* The New Zealand journal was written up by Bacstrom.

Young Parkinson, who was to die of malaria at the age of 25, soon after the vessel left Batavia, worked feverishly to record the finds and it is clear now, from his finished drawings and those which he sketched along with specific notes as to coloration, that he was an accomplished artist, and an outstanding botanical illustrator. He had completed 264 of the more than 900 drawings he had begun before he died.

When they returned to England Banks planned to publish the results of their voyage — descriptions and illustrations of 1 400 new taxa and records for a total of

3 600 species in a 14 volume folio work. He put aside £10 000 for the purpose and the work initially started in his New Burlington Street house.

Between 1771 and 1777 Parkinson's colour notes permitted four other artists, John Frederick Miller, James Miller (his brother), John Clevely and Thomas Burgis to make another 213 completed drawings. Banks employed them and they were supervised by Daniel Solander. In 1777 Banks moved to Soho Square.

Jonas Dryander, another Linnean pupil, came to work as librarian, Clevely and J. F. Miller left and were replaced by Frederick Polydore Nodder. Nodder, James Miller and Burgis completed another 271 drawings (mostly by Nodder) and by 1784 a total of 748 drawings had been completed including those completed by Parkinson on the voyage.

During both the Burlington House and Soho Square phases Banks hired 18 master engravers to make copper plates from the finished drawings. A total of 743 copper plates were engraved of which 738 survive today in the British Museum (Natural History) library.

The plates are engraved in pure line, the engraver working directly onto the polished copper with a sharp burin. Each shading of the stem, each fold of the leaf relies on the thickness and depth of the engraved line, the deeper channels carrying more ink and printing darker, the lighter areas achieved by shallower engraving. In fact some plates also included aqua tint and mezzotint finishes. At a time when the art of engraving was probably at its highest level in English history, Banks hired the best engravers there were. It cost him £7 000 just for the engravings, the equivalent today of about one million pounds. Then after 13 years work the plates were not published!

My own studies of the collections and journals have shown that Banks and Solander had brought back 3 607 species and some 30 000 individual specimens. Of these I estimated that 1 400 were entirely new at that time.

The reports of a second expedition with Cook on which Banks and Solander were to go, but which for political reasons they never did, caused Linnaeus a difficult time. He had awaited eagerly the publication of the *Endeavour* finds and wrote to a friend in 1771:

> I have just read, in some foreign newspapers that our friend Solander intends to revisit those new countries, discovered by Mr Banks himself . . . This report has affected me so much as almost to deprive me of sleep . . . Whilst the whole botanical world, like myself, has been looking for the most transcendent benefits to our science, from the unrivalled exertions of your countrymen, all of their matchless and truly astonishing collection, such as has never been seen before, nor may never be seen again, is to be put aside untouched, to be thrust into some corner, to become perhaps prey to insects and destruction . . . By all that is great and good, I entreat you who know so well the value of science, to do all that in you lies for the publication of these new acquisitions, that the learned world may not be deprived of them . . . I confess it to be my most ardent wish to see this done before I die.

Linnaeus did not get his wish. Solander died in 1782, his scientific journals still unpublished. Banks continued to speak of publishing the engraved plates but never did. He was too busy as president of the Royal Society, as the king's adviser on making Kew Gardens the great botanical complex which it is today, in delving into and becoming a part of every scientific proposal, finding and organisation of the time. And the loss of the American colony had caused economic disruption to the wool trade from which Banks derived a substantial part of his income. Besides, his huge mansion at 32 Soho Square was hospitably open, as were his encompassing collections, to any man interested in science. Although the plates and journals did not become prey to insects as Linnaeus had feared, they were "put aside untouched" and "thrust into a corner", although a safe one for all those years.

The publication of *Banks' Florilegium* was completed (March 1989) and is accompanied by a two-volume definitive catalogue written by Elaine Shaughnessy, Judith Diment and myself and a huge index which is now published. The catalogue brings together all of the elements — the specimens, the drawings, the engravings and the manuscripts. In the preface we have written: "some justice, long overdue, being paid to these scientific pioneers, Banks and Solander." Whatever reservations systematists have about nomenclature and taxonomic priorities since 1771, there can be no doubt of the propriety in setting the record straight for the *Endeavour* collections.

By examining Bacstrom's catalogue to the drawings we were able to deduce that the 743 copper plates were engraved of which 738 survive. Most of the plates had been inked up before as black impressions were made by the engravers. Solander's death was the obvious reason for the demise of the project and even though Banks survived to 1820 he never made an attempt to publish. However, it is known that the proofs were sent to various other people — Haller in Berne, Cavanilles in Paris, and the Alstroemers in Stockholm. Shortly before his death, Banks bequeathed his collections to Robert Brown. Brown negotiated with the Trustees of the British Museum at Bloomsbury and in 1823 the collections were transferred there. Brown was appointed as the first keeper in 1827, and the *Endeavour* materials remained untouched until his death in 1858.

The third keeper, William Carruthers, Keeper from 1871-1895, considered publishing the plates. He first proposed to the trustees that they should be published in 1890 but initially he was turned down. The Dalaw Company offered to print the plates in an edition of 100 but they were firmly shown the door. Kirk, writing the *Flora of New Zealand,* wanted to use some of the images and, although the trustees agreed, Kirk died before the New Zealand flora came to fruition.

All of the other ideas failed at the time. George Murray succeeded Carruthers as Keeper in 1895 and he submitted a report to the trustees in 1898 recommending publication of the plates from both the first and second Cook voyages. In 1899 the proposal to print the plates using lithographic transfer was approved and between 1900 and 1905 Hazell, Watson & Viney printed the

materials from lithostones — the images based on the original engravers' proof pulls. The project was edited by James Britten (later to become Keeper) and 318 of the Australian plates together with a couple of new lithos, made by Robert Morgan, appeared between 1900 and 1905 in a three-volume work known as the *Illustrations of Australian Plants.*

Between 1963 and 1973 a sample of the best 30 plates in the whole collection was published in black and white in an edition of 100 under the misnomer of *Captain Cook's Florilegium.* It was printed and published by the Unicorn Press at the Royal College of Art in conjunction with the British Museum (Natural History). The text was compiled by William Stearn and Wilfred Blunt based on the Solander originals. Seven years ago one copy was sold in auction for £3 500. Today it would fetch more than £7 000. The security of the museum was incredibly slack at this time and the discrepancy between the 743 plates completed by Banks and the 738 that survive is due to the fact that five of the best plates were stolen from the College of Art. Edward Egerton-Williams, the master printer of *Banks' Florilegium* hired two Banks' plate engravers to remake the five missing plates from the contemporary black and white proofs. I have seen the results and I have to tell you that the detail is remarkably accurate. These are now published as a supplementary set based on the five new plates.

In 1978 my neighbour Nigel Frith and I put our heads together and suggested to Editions Alecto that we publish the plates. The initial discussions were drawn out and very boring about how we should go about it. Eventually in June 1980 we had a scheme. The publication would be a joint venture between the British Museum (Natural History) and Alecto Historical Editions and the printing would be undertaken in a brand new studio under the direction of the brilliant master printer, Edward Egerton-Williams.

Alecto is named after one of the four Greek furies. The company is the publisher of prints by John Piper, David Hockney, Allen Jones, Eduardo Paolozzi and William Scott amongst the outstanding English artists, and of the Americans Jim Dine, Claes Oldenburg, George Segal, Edward Ruscha and Robert Graham.

In recent years it has moved into historical projects and in addition to the *Banks' Florilegium* Alecto has published the facsimile of the *Dömesday book* together with 31 county editions, the famous Audubon elephant folios of birds, and recently the Bodmer engravings/aquatints of North American life in the 1850s based on the drawings made for Maximilian III.

Pretty soon it came apparent that, to print the 738 plates of the *Banks' Florilegium* properly and turn a set of scientific engravings into a work of art, which is to say as near to perfection as could be reached, it would have to be printed in colour. There is a little flimsy evidence that Banks' himself thought of doing them in colour on one occasion.

The master printer, Edward Egerton-Williams, a former employer of Alecto who trained at Winchester College of Art with Charlie Newington, is a perfectionist with infinite patience. He set up his own studio in the east side of London, near Broad St. which is well-known for having large warehouse premises. In fact he mortgaged his own house for this purpose and spent a fortune over six months to build the studio.

Edward tried out a variety of different techniques to colour the images. He tried hand-colouring over lightly printed impressions and achieved lovely prints but found that the water colours dulled and hid the clarity and freshness of the finely engraved lines. Edward then became inspired and tried out a 17th century technique invented by the Dutch artist, Johannes Tayler, called *á la poupée,* in which a bunched piece of cloth or dolly (poupée) was used to work in each colour directly into the plate, with in some cases up to 15 colours.

Edward over the years has always had between 16 and 20 artists and printers in the studio at any one time and indeed has employed more than 80 people over the years. He is such an incredible perfectionist that most printers only lasted a few weeks. Others such as Mike Lingfield and Michael Barrett have been with the project from the very beginning.

To complete the team, Judith Diment and I were the editors of the project and our work was greatly enhanced by the assistance of Alecto's researcher, Elaine Shaughnessy. The design and printing of the title pages and the mounts is undertaken by Ian Mortimer and Julia Horsfall at Ian's IMPRIMIT typography studio. Ian is one of those rare fanatics who collects all known historical typefaces and printing equipment. One of his recent works has included a lavish production of Dante's *Inferno* with the superb British artist, Tom Phillips and at the moment he is reprinting 110 of the original wood blocks from the 17th century edition of Matthioli's *Herbal.*

When we began the printing of the *Florilegium* the plates were still wrapped in the original acid laden 18th century layers of paper which has eaten minute pock-marks into the soft copper. On top of this the black ink, used for early proofs, had hardened deep into the incised lines and had taken on the consistency of stone. The process of printing the plates began with cleaning the surface with small burnishers and jeweller's rouge. Then chemical washes were applied to break down and float out the hardened ink. The surface was then chromed for protection and this in itself was a specialised chroming technique but similar to the way chromes are applied to car fenders.

The plates were then ready for inking in colour, an immensely subtle and complicated process since the prints must be precisely true to Parkinson's original colours and to the scientific accuracy of each plant reproduced. Parkinson's notes on the backs of his drawings were carefully taken in and there were many talks with me at the Museum. Each of the inks was individually prepared and enough of the pigment was manufactured for the entire edition.

The plates were inked up and underwent a proofing stage which could take up to three weeks. It was during this period that most of the discussions between myself and the proofing printer took place. When the proofing was completed Mick Barrett made an offset. The offset

thus had the image the same way around as the plate and it was marked up with brightly coloured inks according to exactly how each of the individual inks must be applied by the editioning printer. Editioning took about three weeks. (Thus, it took about nine to 12 weeks from the first unwrapping of the plate until the final editioned and hand-coloured print was put into its box.) Then the inked plate was put into the press bed, especially made dampened Somerset full rag, acid-free paper, both were covered with a felt press blanket and a ton-and-a-half arm-applied roller pressure was applied forcing the damp paper into the excised lines.

The plate was then taken out of the press and inked all over again. This was to be repeated 116 times for each of the 738 plates. With a rejection rate up to 25 percent and some plates taking four hours to ink up explains why the project has taken so long. In fact accounting for the rejection rate plus the fact that there are 116 plates pulled for each image means that 107 010 pulls have been made since June 1981. Even working on every day of the year has meant that at least 33 pulls per day have been taken since the beginning of the project.

The prints were laid flat to dry for six days before being hand coloured. When they had been hand coloured each print was blind embossed with the printers and publishers chops and each one is signed by the individual editioning printer. They were then put into mounts and boxed up. The Solander boxes, 31" x 24" x 2 3/4 " weigh about 34 lbs. They are constructed of very thick board and finest library buckram. Each portfolio weighs about 45 lbs in all.

There are 34 portfolios in all, each containing 22 or 23 prints. The portfolios of parts 33 and 34 came out in 1989 and the total subscription price to all 34 parts is $300 000. The Australian plants, consisting of 337 plates, make up parts one through 15. There are then portfolios, in varying numbers for Brazil, Java, Madeira, New Zealand, The Society Islands and Tierra del Fuego; 34 boxes in all. One of our recent exhibitions in March last year at The Monte L. Bean Museum included the 89 plates from the 114 drawings sketched by Parkinson in the Society Islands in 1769.

It is possible to go to the herbarium of the British Museum (Natural History) today and see there row after row of the fine mahogany cabinets especially built for Banks to hold his collections. Stacked five high they rise to over 11 feet, whole corridors of them, the Banks' Herbarium. You can take the same plant from one of the cases which Banks or Solander plucked out of the earth in Australia, New Zealand or Tahiti, where no outsiders had collected before, carry it to his journal in the library, look up the day, more than two centuries ago, on which he examined it, read Solander's description in his own hand and go to Parkinson's water-colour drawing. It is a moving experience. Finally, you can go to the Egerton-Williams print studio and hold a freshly, perfectly printed plate of that same plant, a piece of *Banks' Florilegium.*

More recently we have turned our attention to other plates within the Natural History Museum based on plants collected from Australia. In 1990 the Egerton-Williams studio in conjunction with the Natural History Museum and Alecto Historical Editions completed printing and hand-colouring the 15 copper plates made by Ferdinand Bauer from the drawings he made on the Flinders' voyage to Australia between 1801 and 1805.

Like the Banks' plates the attempts to illustrate Robert Brown's *Prodromus Novae Hollandiae* was a comparable publishing disaster to the *Banks' Florilegium*. Out of more than 2 000 exquisite drawings made during the voyage and more than 300 beautifully executed finished drawings in London only 15 were ever made into plates by Bauer. He published only three small fascicles of what was to be a much larger work to accompany Robert Brown's *Prodromus.* In fact, one of the reasons was that these images were much more complicated than the Banks' plates. They were effectively a mixture of light engraving and aquatint to be used as templates or outline images for hand-coloured images rather than for black and white or coloured engravings. Because of the technical difficulties of producing hand-coloured plates in the sense that they are much harder to produce in any quantity, coupled with the fact that Bauer could not find anyone to make his copper plates or undertake the hand-colouring, less than 50 copies of the edition were made at the time. Today the whereabouts of only four copies are known precisely. Bauer became totally disillusioned at the cost of production, speed of production and the lack of public or institutional interest. He abandoned his project and went home to Austria.

The new edition is only 35 in number. It has taken 18 months to produce 15 images in the edition and the final cost is £15 000.

In today's world to undertake these kinds of projects, the *Banks' Florilegium*, and the *Bauer Illustrations* are rare. Indeed the *Banks' Florilegium* is the biggest fine printing project of its kind and the Bauer project includes the most exquisite plates ever made. I would like to pay tribute to the dedication of the publishers and printers in seeing both these projects through. The publishers have guaranteed that there will not be other editions in the next 50 years. In fact it is inconceivable that any one will be willing to go through this torture again. There are many corpses in the history of fine art publishing. It has been a privilege to work on these projects and I hope that you agree with me that both the *Banks' Florilegum* and the *Bauer Illustrations* are two major stocks of western civilisation. To give some comprehension as to the enormity of the *Banks' Florilegium* over the last two centuries it has had a gestation period of 25 years work and employed more than 120 people; three years and nine people on the first voyage of Captain Cook; 12 years, two botanists, five artists and 18 engravers between 1771 and 1784 and, 200 years later, a decade devoted to its printing by more than 80 printers and artists at the Edward Egerton-Williams studios, two typographers at IMPRIMIT and two editors and a researcher at Alecto and the British Museum (Natural History). Similarly, the Bauer's have taken 18 months to edition 35 plates from 15 images involving four printers, three hand-colourists, the countless hours spent by Ferdinand Bauer himself and 18 years to make a restrike.

# Ferdinand von Mueller's Library

**Sara Maroske*, Doris Sinkora* and Helen M. Cohn***

During his boyhood in Germany, his forty-three years as Victorian Government Botanist (which included seventeen years as Director of the Melbourne Botanic Gardens) and also his numerous terms as office bearer and member of local and overseas learned societies, Mueller amassed a library in excess of 5 000 volumes. Most of this still exists and is incorporated in the National Herbarium of Victoria Library. It constitutes an impressive selection of the works published on botany up to the end of the nineteenth century and includes rare items not found anywhere else in Australia. A project to publish the correspondence of Ferdinand von Mueller has brought together letters and other documents, which shed light on the story of Mueller's library and also help to establish its importance.

"I will write for the number of the Regensburg botanische Zeitung required by you", promised Mueller to New Zealand botanist Thomas Cheeseman on 21 August 1896. "I secured the volumes of the last century and earlier part of this century by some chance already in my boyhood." [1] This is a comment which dates the beginnings of Mueller's library in the years before 1847, which he spent in Germany. Moreover, the full title of *Flora oder allgemeine botanische Zeitung* also indicates his predominant interest even then was in botany. *Flora* is regarded as the world's earliest journal dedicated exclusively to botany and is also the oldest botanical journal which is still being published.[2] Mueller's memory about his holdings, however, is clearly faulty, because *Flora* was first published in 1818, not as he states in the eighteenth century. Furthermore, an 1865 list of Mueller's books states that the earliest volume which he owned was dated 1828.[3]

In his letter to Cheeseman, Mueller may have confused the Regensburg *Flora* with *Flora Danica* which was first published in 1761 and of which Mueller secured the first ten volumes up to the year 1823.[4] Only a few fragments of Mueller's *Flora* are now part of the library at the National Herbarium and it is not known what happened to the rest. According to *Scientific Serials in Australian Libraries,* the botany library at the University of Melbourne, the South Australian Herbarium and the CSIRO library at Black Mountain are the only three other Australian libraries which hold nineteenth century copies of *Flora.*[5]

No doubt *Flora* was useful to Mueller in the studies he did in pharmacy and natural history, and for the PhD in botany which he obtained from the University of Kiel in 1846.[6] In the nineteenth century, pharmacy was a profession which required an extensive knowledge of plants – medicinal and economic – making a thorough study of botany essential. A receipt which was discovered, loose in a volume of Mueller's *Flora,* while this article was being written, shows that Mueller acquired parts 13 to 19 of the 1846 *Flora,* and volume 7, part 1 of D. F. L. Schlechtendal and E. Schenk's *Flora von Deutschland,*[7]

Fig.1. Ferdinand von Mueller (1825-1896), Victorian Government Botanist 1853-1896.

from Herold's Bookshop in Hamburg in 1846. The surviving early correspondence between Mueller and medical student F. Albert H. Schütt confirms that Herold's was a frequent supplier of books for Mueller. On 8 December 1843 Schütt informed him that Friedrich Heinrich Wigger's 1780 compilation of G. H. Weber's writings, *Primitiae florae holsaticae,* was not yet in stock but that he would keep asking for it. In a letter from Herold's itself of 9 August 1844 , Mueller was informed that the firm had written to various antiquarians to try to get a copy of the book. Neither Schütt nor Herold's, however, seem to have been successful in their search, because the copy of this work held by the National Herbarium Library bears Mueller's inscription indicating that it was a gift from Lars Hansen. He was a school teacher and friend with whom Mueller sometimes went botanising in Schleswig-Holstein.[8]

In 1847 Mueller and his sisters, Clara and Bertha, emigrated to Australia. "[W]ith my inherited disposition to pulmonary phthisis", recalled Mueller in an 1847 letter to the German botanist Rudolph von Fischer-Benzon,[9] "I felt I would not survive the next winter in northern or central Europe, and because the oldest of my sisters [Iwanne] had also suffered this disease to which she later fell victim,[10] I migrated to South Australia, to where the stream of German emigrants mainly flowed."[11] Moreover, in the same letter he spoke of his early botanical collecting in Schleswig-Holstein and his wish to explore the vegetation of other parts of the world. Margaret Willis and the *Australian Dictionary of Biography* both state that Australia became the focus of this wish, when Mueller

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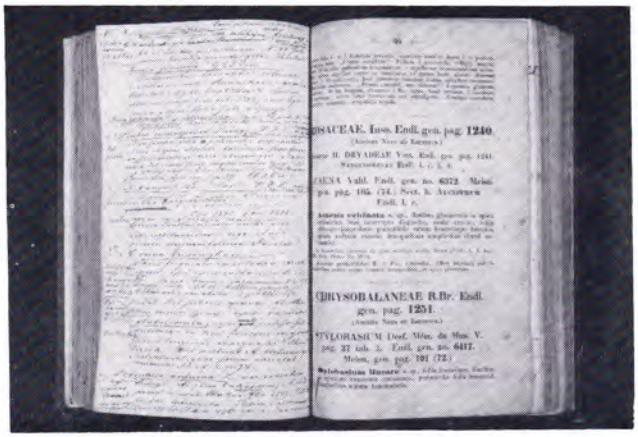
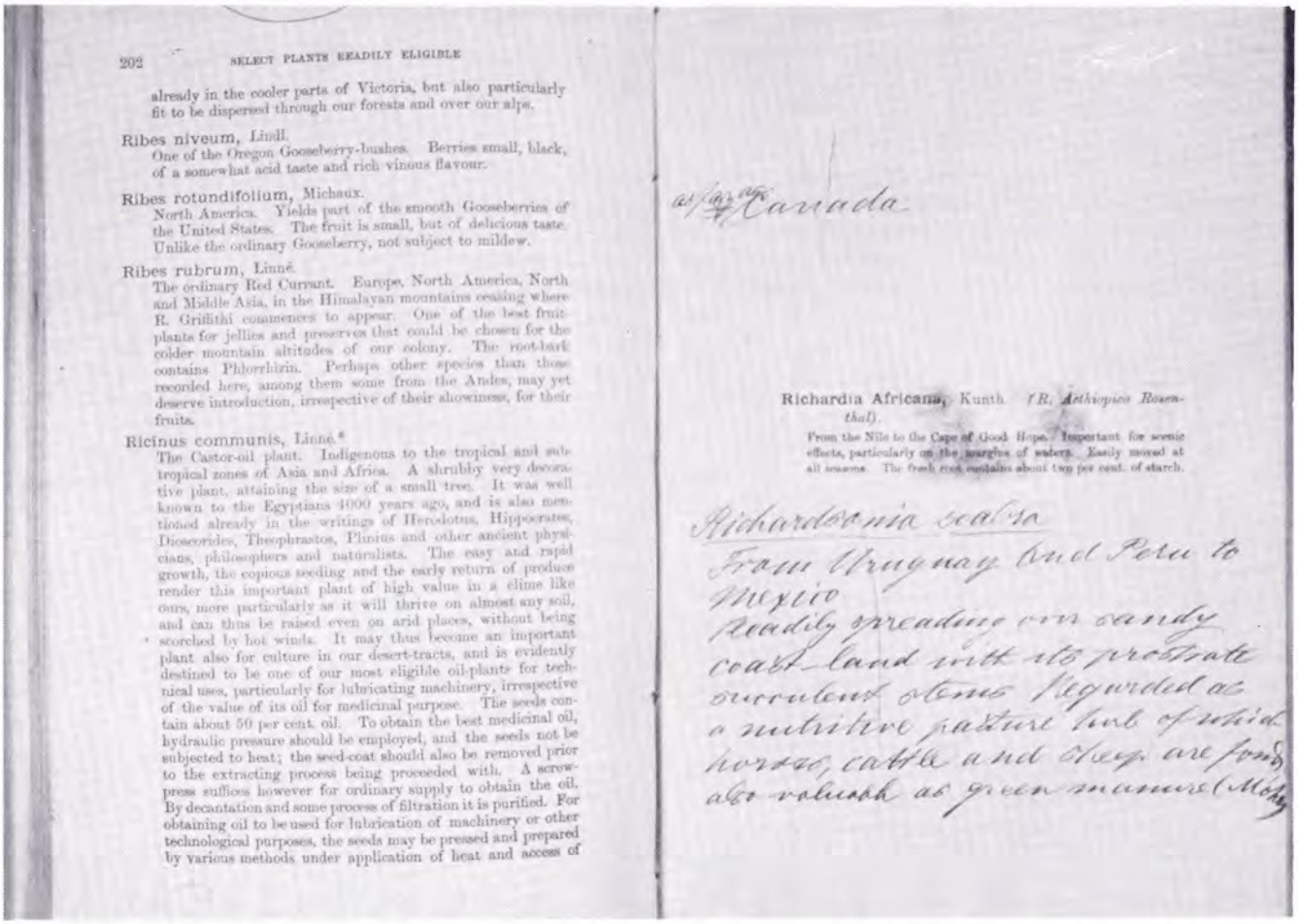


Fig.2. Mueller's liberally annotated copy of *Plantae Preissianae*, volume 1 by J.G.C Lehmann (Hamburgi: 1844-45).

met J. A. L. Preiss in Germany in the 1840s.[12] Preiss had returned from a collecting trip in Western Australia in 1842 and had sold some of his specimens to Dr O. W. Sonder[13] who was a friend of Mueller. There does not appear, however, to be any evidence to suggest that Preiss and Mueller did actually meet.

A copy of J. G. C. Lehmann's edition of *Plantae Preissianae* is in the National Herbarium Library and it is not only inscribed by Mueller but also interleaved with pages of his copious hand written notes in Latin (Fig. 2). The pages shown in the photograph are from volume one and are concerned with the families *Rosaceae* and *Chrysobalaneae,* and Mueller's annotations give details on species which occur in the south-eastern parts of Australia. At the front of the volume is an inscription, indicating that Mueller started making insertions in it almost immediately on his arrival in Australia.[14] He undoubtedly brought the book with him from Germany, perhaps as a gift from Dr Sonder, who is also thought to have written an inscription at the front of the volume: "I demand instruction, truth and knowledge. Chamisso". Thus it seems that Mueller was already collecting the basic botanical works he would need to make his own contributions to studies on the native Australian flora before he arrived in the country.

Lieutenant Governor C. J. La Trobe appointed Mueller Government Botanist in 1853 and thus made possible the field work and study which provided the new information for the the bulk of Mueller's publications. A bibliography of these writings, published in 1978, with a supplement in 1984, contains 1 431 entries, making Mueller a strong candidate for the scientist with the most works ever published.[15] The National Herbarium Library has all but a few of these works. Notable among them are copies interleaved with blank pages on which Mueller made corrections and annotations for future editions. *The Select Extra-Tropical Plants, readily eligible for industrial culture or naturalisation, with indications of their native countries and some of their uses* was first published in 1876 but Mueller was always looking to improve its usefulness. It was subsequently republished eleven times, including French, Portuguese, Indian and German editions[16] (Fig. 3). The 1876 interleaved copy shown in the photograph is open on a page where the main annotation reads:


202 SELECT PLANTS READILY ELIGIBLE

already in the cooler parts of Victoria, but also particularly fit to be dispersed through our forests and over our alps.

Ribes niveum, Lindl.
One of the Oregon Gooseberry-bushes. Berries small, black, of a somewhat acid taste and rich vinous flavour.

Ribes rotundifolium, Michaux.
North America. Yields part of the smooth Gooseberries of the United States. The fruit is small, but of delicious taste. Unlike the ordinary Gooseberry, not subject to mildew.

Ribes rubrum, Linné.
The ordinary Red Currant. Europe, North America, North and Middle Asia, in the Himalayan mountains ceasing where R. Grifithi commences to appear. One of the best fruit-plants for jellies and preserves that could be chosen for the colder mountain altitudes of our colony. The root-bark contains Phlorrhizin. Perhaps other species than those recorded here, among them some from the Andes, may yet deserve introduction, irrespective of their showiness, for their fruits.

Ricinus communis, Linné.*
The Castor-oil plant. Indigenous to the tropical and sub-tropical zones of Asia and Africa. A shrubby very decorative plant, attaining the size of a small tree. It was well known to the Egyptians 4000 years ago, and is also mentioned already in the writings of Herodotus, Hippocrates, Dioscorides, Theophrastos, Plinius and other ancient physicians, philosophers and naturalists. The easy and rapid growth, the copious seeding and the early return of produce render this important plant of high value in a clime like ours, more particularly as it will thrive on almost any soil, and can thus be raised even on arid places, without being scorched by hot winds. It may thus become an important plant also for culture in our desert-tracts, and is evidently destined to be one of our most eligible oil-plants for technical uses, particularly for lubricating machinery, irrespective of the value of its oil for medicinal purpose. The seeds contain about 50 per cent. oil. To obtain the best medicinal oil, hydraulic pressure should be employed, and the seeds not be subjected to heat; the seed-coat should also be removed prior to the extracting process being proceeded with. A screw-press suffices however for ordinary supply to obtain the oil. By decantation and some process of filtration it is purified. For obtaining oil to be used for lubrication of machinery or other technological purposes, the seeds may be pressed and prepared by various methods under application of heat and access of

as far as Canada

Richardia Africana, Kunth (*R. Aethiopica* Rosenthal).
From the Nile to the Cape of Good Hope. Important for scenic effects, particularly on the margins of waters. Easily moved at all seasons. The fresh root contains about two per cent. of starch.

Richardsonia scabra
From Uruguay and Peru to Mexico
Readily spreading over sandy coast-land with its prostrate succulent stems. Regarded as a nutritive pasture herb of which horses, cattle and sheep are fond, also valuable as green manure (Moby

Fig.3. Muller's copy of the 1876 edition of his *Select Extra-Tropical Plants*, annotated with amendments for the next editon.

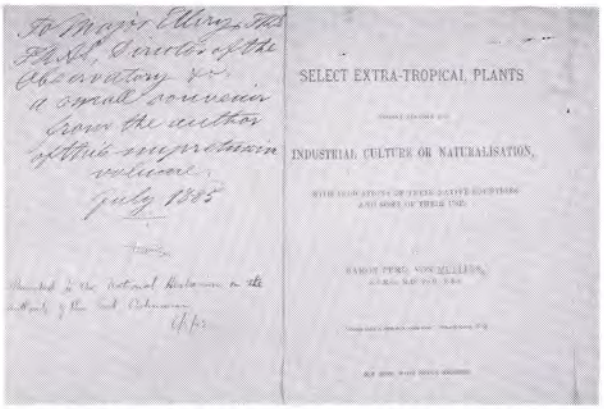



Fig.4. A copy of the 1881 edition of *Select Extra-Tropical plants* inscribed by Mueller to Government Astronomer Robert Ellery.

*Richardsonia scabra*

*From Uruguay and Peru to Mexico. Readily spreading over sandy coast-land with its prostrate succulent stems. Regarded as a nutritive pasture herb of which horses, cattle and sheep are fond; also valuable as green manure (Mohr)*

This information was probably provided by Mueller's friend and botanist, Professor Asa Gray[17] from North America. "Could you spare one day of your precious time to cast your eyes over my "Select Plants"", Mueller asked Gray on 14 April 1878. "From your extensive experience an immensity of additional notes could easily be obtained . . . ".[18] In the following 1881 edition of *Select Extra-Tropical Plants*[19] Mueller's 1876 additions survive in the entry for *Richardsonia scabra* printed on p. 289:

*From Mexico to Brazil. As an herb for pastures and hay crop, appreciated in localities with sandy soil (C. Mohr). It has spread over the Southern States of North America.*

During his first years in Victoria, Mueller was allowed to use government funds to obtain copies of his works to distribute to colleagues, but successive administrations pressured him to reduce his departmental expenses, including what was spent on this privilege.[20] Nevertheless, he continued to promulgate his botanical findings, increasingly via private purchases from the Government Printing Office,[21] and often inscribed these works with gracious remarks about the worthiness of his recipients. Some of these Mueller gifts are in public institutions both in Australia and overseas, and an unknown number are in private hands – trade is brisk when an inscribed volume can fetch hundreds of dollars.

The National Herbarium of Victoria Library has a copy of the 1881 edition of *Select Extra-Tropical Plants* inscribed by Mueller to Robert Ellery[22]: "Accept, dear Major Ellery, the small volume sent herewith. At page 364 you will see, what help is desired from your important Department for the forthcoming new Victorian Edition" (Fig.4). Ellery was the Government Astronomer in charge of the Observatory adjacent to the Botanic Gardens and also responsible for meteorological observations. Page 364 of Mueller's book is a "Table of Average Annual Rainfall and Temperature at Stations in NSW". In the next edition of *Select Extra-Tropical Plants,* page 413 contains a "Table of Averages and Extremes of Temperature of Air in Victoria"; and pages 414-15 a "Table of Average Annual Rainfall in Victoria"; both furnished by the Melbourne Observatory.

In return for his generosity Mueller received many publications from eminent scientists and others, which he duly added to his library. A random selection from the shelves in the rare books room in the National Herbarium Library reveals a copy of *Australia Twice Traversed* (1889)


Fig.5. A portrait of Leonhart Fuchs in his book *De Historia Stirpium* (Basileae:1542), one of the greatest European herbals.

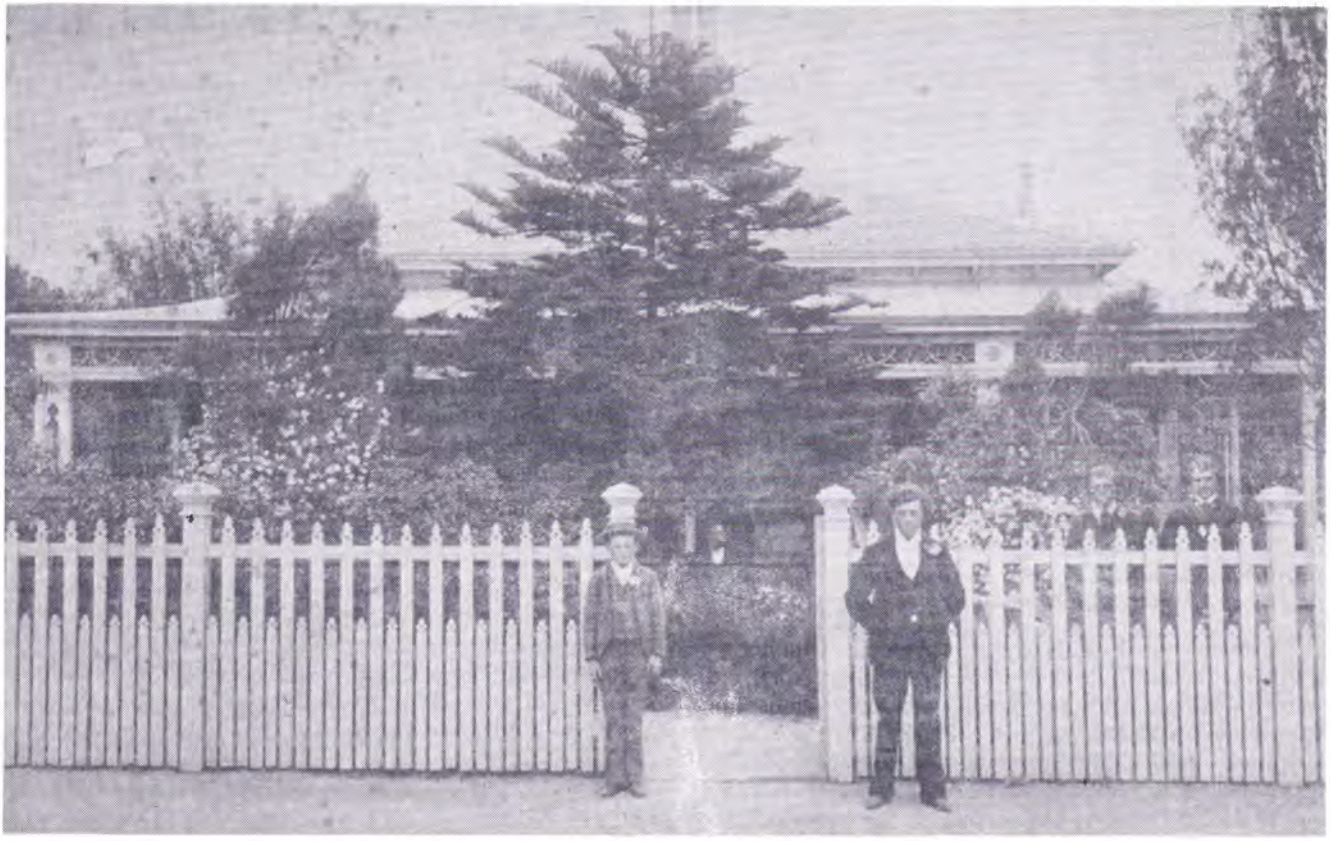


Fig.6. Mueller's home at 28 Arnold Street, South Yarra, which he built after being removed from the directorship of the Botanic Gardens.

inscribed by the author, Ernest Giles: "To my best friend". Giles led five Australian exploring expeditions between 1872 and 1876 under the patronage of Mueller. Nearby on the shelves are copies of fascicles of C. F. P. von Martius's *Flora Brasiliensis* (1865) including A. W. Eichler's *Balanophoreae* (1869), several inscribed by their authors to Mueller. Von Martius collected in Brasil from 1817 to 1820 and founded *Flora Brasiliensis,* which was published in parts from 1846 to 1906. Eichler was an expert morphologist.[23] A copy of J. G. Trog Senior's *Die essbaren, verdächtigen & giftigen Schwaemme der Schweiz* (1845-50) bears an inscription by C. J. La Trobe dated November 1855. Clearly, even though his term as Lieutenant Governor of Victoria had ended, he continued to keep Mueller's interests in mind. La Trobe's gift was about the edible and poisonous fungi of Switzerland, the country to which he moved after leaving Australia.

The names of two famous contemporaries, W. J. and J. D. Hooker, are inscribed on a copy of Francis Boott's *Illustrations of the Genus Carex* (1858). Sir William was director of the Kew Gardens from 1841 to 1865 when his son, Joseph, succeeded him until 1885. Mueller deposited £100 of his £600 salary with the Hookers in 1855 so that they could buy him books,[24] although this one seems to have been a gift. Finally, this casual examination of Mueller's rare books reveals a copy of Robert Brown's *Florae Novae Hollandiae* (1810) with hand-written annotations by the German botanist Curt Sprengel, a gift to Mueller from his friend Dr Sonder. Sonder also inscribed it in Latin: "a most rare book!". Only 250 copies of *Florae Novae Hollandiae* were printed in 1810 and the National Herbarium Library has three copies.

"In the history of science," asserts Agnes Arber, "the honoured title, "The German Fathers of Botany", has been bestowed upon a group of herbalists . . . whose work belongs principally to the first half of the sixteenth century."[25] One of these "Fathers" was Leonhart Fuchs who produced the "botanical masterpiece", *De Historia Stirpium* in 1542. Just how Mueller acquired his copy of this work is not yet known, but it was probably after 1869 because it does not appear in either of two lists of his books which he had made by that year.[26] *De Historia Stirpium* is a Latin herbal dealing with about four hundred native German and one hundred foreign plants.[27] Its woodcuts were of such first-rate quality that they were extensively re-used in later herbals.[28] A woodcut portrait of Fuchs himself is shown in the photograph – an unusual addition for a herbal (Fig. 5). It has been hand coloured at an unknown date but probably in the publisher's office by one of the women illuminators typically employed for this work.[29] *De Historia Stirpium* was not one of the texts which Mueller required for his own botanical work because its species names were superseded by those of Linnaeus. Nevertheless, it still contained useful pharmaceutical information and was also an important work in botanical history.

There are about six shelves of various editions of Linnaeus's works in the National Herbarium Library. Some copies seem to have been acquired by Mueller while he was in Germany and still others after he came to Australia. If Fuchs can be called a "German Father" of botany, then Carl Linnaeus is the "Father" of modern botany. His book *Species Plantarum,* published in 1753, is accepted by international agreement among botanists as the starting point of modern botanical nomenclature. Botanical names published before 1753 are called pre-Linnean and are regarded as invalid. Linnaeus went a considerable way towards solving the problems of inconsistency and inconvenience in the names of plants and animals with his system of binomials. Thus each

name comprised two parts, the first applicable to a whole group (genus) and the second to a single member of the group (species).[30] Once again, it is not known where Mueller obtained his copies of *Species Plantarum* but of the five editions in the National Herbarium Library three are inscribed by him. On the 1753 and 1762 editions he wrote: "Private property of Ferd von Mueller 1871", and on another 1762 edition he wrote: "Liber Baro Ferd a Mueller, 1875". Clearly, Mueller appreciated the significance of this work.

In 1865, Mueller donated the library which he had established thus far to his department:

> *It comprises predominantly such a selection of books as are needed for local investigations into our flora. Had these works been scattered it would have been difficult, expensive and tedious to restore a similar collection. It consists of 1,086, to a large extent costly, volumes, and of many hundred smaller publications.*[31]

The books and journals which he had bought from departmental votes already belonged to the Government but those he had acquired in his boyhood, as presents from friends, and from his private purse, comprised a genuine and a generous gift. Of the works already mentioned, *Flora, Flora Danica, Primitiae florae holsaticae, Flora Brasiliensis* and *Florae Novae Hollandiae* are named in a list of books in Mueller's *Annual Report* as given over to the Herbarium at this time. It is thought that the pencilled "G.P.", which appears on them and many other works listed, was put there by Mueller to distinguish, henceforth, his property from "Government Property".

No other institution in Australia had a comparable library. The Sydney Botanic Gardens acquired twenty-six botanical works for public use in 1852[32] but the Director, Charles Moore, was not vigorous in pursuit of additions to them, like Mueller. The Royal Society of Tasmania collected scientific works from its inception in 1843 but botany was only one of the subjects in which it was interested. University libraries began in Sydney in 1851 and Melbourne in 1856 but remained small for some years and only accessible to staff and students.[33] The colonial public libraries of Sydney and particularly Melbourne rapidly acquired books from 1869 and 1856 respectively but they catered to general rather than specialist interests. There were no doubt a few botanical collections in the hands of private individuals like F. M. Bailey, a plant collector in Queensland,[34] William Archer, a botanist in Tasmania and friend of the Hookers,[35] and the Rev. Dr J. I. Bleasdale in Victoria.[36] Their libraries, however, were undoubtedly nothing to compare with Mueller's and not necessarily accessible either to him or to each other. For a comparable library it is necessary to look overseas to the Kew Botanic Gardens and British Museum in England. While the collections in these institutions were certainly larger than that of Mueller, they shared with him the aim to include those core works necessary to any botanist, who wished to contribute to the international naming and describing of plants.[37]

At the end of June 1873 Mueller's position as Director of the Botanic Gardens was terminated, and he was forced to move out of his government residence. After some time spent in a hotel in South Yarra, he built a house at 28 Arnold Street and established himself there with the books, which were his private property, and also probably his departmental library for which he had no room in his


Fig.7. Some of the books purchased by the Victorian Government under the terms of Mueller's will.

crowded herbarium (Fig.6). Mueller's salary had not increased since his original appointment as Government Botanist in 1853. Now, with less departmental money at his disposal than ever, he could not afford to keep his library up to date. Unfortunately some of the works he could not buy, especially volumes of periodicals, are not to be found anywhere else in Australia. Moreover, because of the cramped and untended conditions in which Mueller was reduced to housing his books, the condition of some of them deteriorated rapidly. Alfred J. Ewart, Government Botanist and Professor of Botany at the University of Melbourne, was appalled by what he saw in Mueller's home. "What I can not understand is how a man of the Baron's standing could keep a valuable library in such a condition", he exclaimed to Under Secretary, Charles Topp, in a letter of 3 December 1908, "unclothed, naked parts unsorted and unarranged, many soiled, damp or insect eaten. Either he had no sense of decency or did not believe in a hereafter."

Mueller died in 1896 but had made his will in 1884. It left specific instructions with respect to his books: "I desire the botanic position of my private library, containing the books purchased by myself since 1866 to be offered to the Victorian Government at a fair valuation"[38] (Fig.7). One of the executors, the Rev. William Potter, moved into Mueller's house, shortly after Mueller's death, and attended the listing and valuing of Mueller's library. Unfortunately the lists of Mueller's books made at the time can no longer be found, so that it cannot be stated which books were bought by the Government. What is known is that it paid £450 for Mueller's library in 1898,[39] a sum which even then must have been regarded a bargain, considering that the coloured plates alone in some books meant they were worth £2 to £10 per volume. Mueller's library was still unique in the 1890s but not quite as obviously so as in the 1860s. Joseph Maiden was to put together a substantial botanical library at the Sydney Botanic Gardens after his appointment in 1896 and F. M. Bailey did the same for the Brisbane Botanic Gardens after his appointment in 1875. Neither Sydney nor Melbourne Universities, however, set up chairs in botany until the twentieth century and the scientific institutions of the other colonies also remained small in the 1890s.

Mueller's library was not immediately removed to the Herbarium in 1898. It stayed with Potter, apparently because he intended to write a biography of Mueller. Not only was no such work produced, but Potter also denied access to Herbarium staff for the research they needed to do in the library. As Government Botanist, Ewart began legal proceedings around 1907, but Potter died on 29 April 1908 before the matter was resolved. His widow allowed the removal of the disputed books. "There are still a number of parts missing from our library sets", complained Ewart to executor, Hermann Buettner, on 9 February 1909, "but as it is impossible to say whether they were lost prior to or after 1896, and as the Trustees have without reserve delivered all books to which I laid claim I have advised the Crown Solicitor to suspend further action, so that we may consider this matter settled."

The library of Ferdinand von Mueller is now housed in the top floor of a new Herbarium building with the rarest items in a secure room. It is under better care than ever Mueller provided for it and yet is as accessible to interested users as Mueller could have wished. The provenance of particular items is still being discovered, and the whereabouts of books not found by Ewart, and also those removed by him during his term as Government botanist, are still being sought. "Though it involved many years' toilsome exertions as well as in the field as in the study to advance our botanical department to its present position", declared Mueller when he handed over part of his library in 1865, "it remains gratifying to reflect, that the labors have not been in vain, and that for independent phytographic researches now in Australia more extensive means and greater facilities exist than in many of the metropolitan institutions of an analogous tendency in Europe."[40] The proud claims of this remark may now seem excessive but they at the least indicate what Mueller set out to do in his work, and testify to the importance of a comprehensive botanical library in its execution.

## References


1. Letter 21 August 1896 from Ferdinand von Mueller to T. Cheeseman (Auckland Institute and Museum, Auckland, New Zealand). Thomas Cheeseman (1846-1923). Unless otherwise stated all manuscripts quoted are held at the National Herbarium of Victoria Library.

2. J. A. Leussink, 'A short history and bibliographical analysis of the Journal Flora . . . ', *Taxon,* vol. 30, 1981, pp. 375-92.

3. 'Annual Report of the Government Botanist and Director of the Botanic Garden', *Victoria. Parliamentary Papers. Votes and Proceedings of the Legislative Assembly,* 1864-5, vol. 4, no. 72, p. 19.

4. As preceding. The plates in Mueller's set are, unusually, uncoloured, which is perhaps indicative of the limited resources he could put towards book buying.

5. Mueller's set began with the year 1828 but those at the CSIRO Black Mountain Library and South Australian Herbarium start from 1818 and the set at the Botany Library at the University of Melbourne commences with volume 5. (*Scientific Serials in Australian Libraries,* Jean A. Conochie (ed), 1976.)

6. Margaret Willis, *By Their Fruits*, 1949, p. 7 and D. M Churchill, T. B. Muir & D. M. Sinkora, 'The Published Works of Ferdinand J. H. Mueller', *Muelleria*, vol. 4, no. 1, 1978, p. 8.

7. The *Flora von Deutschland* was completed in 24 volumes, 1841-1873, but only some of these are in the National Herbarium Library.

8. The National Herbarium Library also possesses Mueller's manuscript notebook dated 1847 which contains his observations on the flora of Schleswig-Holstein (M42). Lars Hansen (1788-1876).

9. Rudolph J. D. von Fischer-Benzon (1839-1911).

10. Iwanne Müller died in 1845, aged 20.

11. Letter 16 December 1887 from Ferdinand von Mueller to Rudolph von Fischer-Benzon (MS:C666, Landesbibliothek, Kiel, BRD).

12. Willis, pp. 10-11 and Deirdre Morris, 'Baron Sir Ferdinand Jakob Heinrich von Mueller', *Australian Dictionary of Biography.* vol. 5, 1851-1890, pp. 306-308.

13. Otto Wilhelm Sonder (1812-1881).

14. The National Herbarium of Victoria has specimens collected by Mueller on 15 December 1847, the day of his arrival in Australia, including two marine algae which were plucked from over the side of the ship as it was approaching Adelaide through St Vincent's Gulf. (Wommersley & Sinkora, 'Ferdinand Mueller's earliest Australian Plant Collections', *Australian Systematic Botany Society Newsletter*, no. 52, 1987, pp. 11-13.)